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ABSTRACT

This paper aims to estimate the effects of individual and institutional factors on college transfer. The author used logistic transgression to estimate the probability of transfer. The author assumes the probability of transfer from a two-year institution to a four-year institution is a function of student characteristics, type of institution in which student is enrolled, and the tuition gap facing students at the time they intended to transfer. The author's research is based on data from the National Center for Education Statistics (NCES) BPS (Beginning Postsecondary Student Longitudinal Study) 89/94, IPEDS (Integrated Postsecondary Education Data System) Fall Enrollment Survey, and Institutional Characteristics Survey 89/90 and 97/98. The combined and limited sample totals 1,370 observations. Of this number, 236 transferred within five years. The research results indicate that public institutions perform better than private two-year colleges, and that the tuition gap has a significant negative impact on student transfer. Other institutional factors, such as racial and gender composition of student body and size and location of institution, have no significant effect on transfer. The author concludes that scholarship or tuition aid will greatly reduce the economic burden placed upon transfer students while increasing the pool of prospective students by lowering their expected costs of transfer. (Contains 43 references.) (NB)

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Do Institutional Characteristics Matter in Two-to-four-year Transfer?

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Abstract:

In past two decades, we observe both relative low level of two-to-four-year transfer rate and high focus on collegiate function of community colleges. Previous literature overlooked the impact of non-organizational institution characteristics on transfer and rarely tested effect of two- and four-year college's tuition gap on two-year entrant's transfer. Based on data from BPS89/94 and IPEDS Fall Enrollment Survey and Institution Survey 89/90, the results concludes that public institutions perform better than private two-year colleges and tuition gap between four- and two-year institutions has significant negative impact on student transfer. But other institutional factors as racial and gender composition of student body, and size and location of institution have no significant effect on transfer.

Do Institutional Characteristics Matter in Two-to-four-year Transfer?

Introduction

Recent critiques about community college focus on it's declining collegiate function, in terms of decreasing transfer rate and graduation rate. System evaluations, City University of New York: An Institution Adrift (1999) for instance, pay much attention to the poor performance of public institutions. State performance in community college to baccalaureate transfer varied significantly while some states scored very low on transfer, according to Measuring Up 2000 and 2002 (NCPPHE 2002, Wellman 2002). Furthermore, student level studies real some worrisome patterns. Early longitudinal studies found that transfer rates of different cohorts were not stable overtime. Based on NLS72 and HS&B Grubb concluded that two-to-four-year transfer rate among all students were 28.7 percent for class of 1972 and 20.2 percent for class of 1980 (1991).

Results from later longitudinal researches showed similar results. McCormick and Carroll (1997) pointed that among all students in BPS89/94 data set, 42.6 percent transferred to another postsecondary institution. However only 21.79 percent transferred to a four-year institution—as traditionally defined as "forward transfer"[1]. BPS95/01 confirmed that about 20.4 percent of all two-year entrnats successfully transferred to a public four-year (Berkner, He, Cataldi and Knepper 2002)[2].

However, several forces are converging to push more students to community college. First there is a rapid growth in the number of high school graduates in some states such as California, Arizona, Florida, North Carolina and Texas, and an increase in proportion of poor and minority students among different age cohorts (NCPPHE 2000). Second more stringent admissions

[1] One critic of the community college transfer rate used in most longitudinal studies is that the actual result is sensitive to the definition of "transfer". Bradburn, Hurst and Peng (1997) proved that under competing definition of transfer, transfer rate can be as low as 31.8% if conditioning on educational aspiration greater or equal to bachelor's degree; or as higher as 50.7% if conditioning on student self-report that they were "pursuing academic major and taking courses toward bachelor's degree".

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requirement in public four-year institutions and rising college tuition make community college more attractive to many first-generation college students and non-traditional students (Rouse 1995, Wellman 2002, Ehrenberg and Smith 2002). Finally the labor market returns to Baccalaureate graduates and Associate Degree holders are consistently higher than that of high school graduates, even college dropouts share some wage premium comparing to high school dropouts (Rouse 1995, Leigh and Gill 2002, Grubb 2002). All these factors make community college's role in human capital development and economic growth even more crucial. Thus improving the effectiveness of two-to-four year transfer has become policy priority in many states as California, Florida, South Carolina, Texas, Missouri, to name only a few (Education Commission of State 2001, Burke & Associates 2002, NCPPHE 2002)[3].

Given above observation the question of this paper is why there exists such a contradiction between the increasing importance of collegiate function of community college and the declining of its ability in promoting students' transfer? Can the declining in transfer be explained by the demographic changes in student body, by the characteristics of community college students attended, or other external factors such as state policy on transfer of credits or tuition?

To our knowledge, such questions have not been fully resolved by current literature. Existing studies on transfer heavily focus on using student's demographic traits, family background, and their college experiences to interpret transfer behavior (Lee and Frank 1990, Dougherty 1991, 1994, Dougherty and Kinzel 2003). However, we find after controlling those factors, there is still large residual (unexplained variance) in the probability to transfer.

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[2] The results may be outcomes of natural competition in postsecondary education system and reflect the realization of multiple missions of community colleges (Bailey and Averianova 1998).

[3] Education Commission of the States (2001) reported that 30 states have written transfer and articulation policy into legislation through statutes, bills or resolutions, 40 states have statewide cooperative agreements between institutions of higher learning, 33 states have transfer data reporting system, 18 states provide extra incentive by offering financial aid, guaranteed transfer of credit or priority admission to transfer students, and at least 23 states have common core curriculum to streamlines the articulation process.

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In order to get more insight, this paper develops the traditional model by two ways. First we introduce a set of institutional characteristics as additional predictor of transfer success; second we estimate this model with data from BPS89/94 and IPEDS89/90. The results show that holding individual's demographics, family background and college experience constant, students studying in public institutions have a higher possibility to transfer than their counterparts in private non-for-profit or private for-profit institutions. While other institution characteristics, as percentages of minority, female and part-time students, the institution size and location have no statistically significant impact on transfer. Furthermore we find tuition difference between in-state-four-year institution and student own college has significant negative impact on potential transfer. The increasing public four- and two-year college tuition gap may block student's eventual transfer[4].

The rest of the paper is organized as follows. The next section reviews literature on determinants of community college transfer. The third part shows the data and results. Finally we will discuss topics for further study and policy recommendation.

Determinants of Two-to-four Year Transfer Success

College transfer can be viewed as a rational choice based on the existing information, time and credit constraints. Like college choice that is determined by student's academic ability or college preparation, family wealth, and college reputation and tuition, transfer is conditioned on a set of student and institution constraints as well.

Student's characteristics and family background are often used as predictors of transfer success. Dougherty (1994) suggested that concentration of disadvantaged students in the community college justified the difference in continuation on to the upper division between community college and university entrants. Previous studies also show that students who are female, working class, nonwhite, or have weak high school academic records are less likely to transfer to four-year

[4] In 1989-1990 average tuition in public four-year institutions is $1,760 while $820 in two-year ones. In 2002-2003, average national public four-year tuition is $3,506 while the tuition of two-year college is

institutions (Grubb 1991Lee and Frank 1990, Velez and Javalgi 1987). Recently there is renewed interest in investigating the relation between student age and transfer or completion rate, because more non-traditional age students participate in community college and lifelong learning becomes national priority (Dougherty and Kinzel 2003).

Alternative theory indicates that high school and college experiences are crucial triggers in college transfer. A comprehensive discussion of student's characteristics that facilitate transfer comes from Lee and Frank (1990). Their basic conclusions reported college experience had deterministic effects on eventual transfer, such as number of semesters of math and science courses, number of semester in full-time college and credit taken[5].

Sociologists introduced "educational aspiration" as a strong predictor of college transfer. Most literature suggest that students with degree goal equal or higher than bachelor degree are more likely to transfer than students with degree goal as certificate or associate degree as terminal degree (Bailey ed al. 2002, Berker, He, Cataldi and Knepper 2002, McCormick and Carroll 1997). Berker, He, Cataldi and Knepper (2002) found 22.1 percent of students with Bachelor or higher degree goals transferred to four-year institutions while of all students whose degree goal was Certificate degree only 5.1 percent students eventually transferred to a four-year college. Previous studies also show that once controlling for educational aspiration of community college students, the effects of student's demographic factors on educational outcome reduced although still statistically significant (Bailey ed al. 2002).

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below $2,220 and there is no indication that the gap will converge in near future.

[5] Most recent study on educational outcomes of occupational postsecondary students shows that a couple of "pathway" indicators are important in modeling community college student's persistence and completion rate, such as whether student interrupted study during college years, or attended part-time or had delayed enrollment or work while enrolled (Bailey ed al. 2002). Students having such experiences have lower probability to transfer and get B.A. degree as well. However such factors are highly positively correlated with age of students when first enrolled in college, to be specific, which means that older students are both more likely to experience such pathway and have lower transfer rate. We use pathway factors such as delayed enrollment and part-time enrollment in our estimation, but they fail to improve our model's goodness-of-fit because of their highly collinearity with students' age and therefore are dropped out from our report of results.

The most widely cited, however less tested assumption about the two-to-four year transfer is that there are some institutional factors that systematically impede students' transfer. It is known as "cooling-out" effect of community college (Clark 1960, Pincus 1980, Rouse 1998) and well documented in qualitative researches based on individuals or individual institutions (Garza 1998, Banks 1992, Dougherty 1994). One recent explanation emphasized the "vocationalization trend" diverts promising students from obtaining B.A. degree (Dougherty 1994). The theory indicated that community college draws more students into programs that largely do not encourage transfer, as certificate program while demoralizing the academic programs that do encourage transfer. Researchers use existence of academic counciling, faculty's involvement in promoting transfer, and mix of academic and occupational curriculum to capture the institutional effects (Garza 1998). Although quantitative methods are widely used to estimate the negative impact of community college on educational attainment (Rouse 1995, 1998, Leigh and Gill 2002), there is rare case when the effects of community college on transfer are empirically estimated. Because there is large difficulty in operationalizing such institutional factors and integrating them into empirical estimation.

Alternatively there exists many observable institutional characteristics which might influence transfer. Different type of institution has different transfer rate. According to the type of first institution of all the transferred students, 59.7 percent students originated from public two-year institutions transferred to a public or private four-year institution; while only 13.9 percent of students started at private for-profit less-than-4-year institution transfer to a four-year institution within 6 years (Bailey ed al. 2002, Berker, He, Cataldi and Knepper 2002).

Gender and ethnic composition and location of institutions may play a role in potential transfer. Castaneda (2002) pointed out that African American have the lowest completion and transfer rate among all ethnic groups. The racial difference can be reinforced by geographical location of institution. For instance, suburban black men and women were four times as likely to have

completed a four-year degree than rural black men and women (Fratoe 1980). Studies found that Hispanics have high level of transfer aspiration but low transfer rate than White (Cohen 1996). But new NCES report (1998) challenged this conclusion and stated that Hispanics transferred at a higher rate than either Black and White. Finally institution size may also contribute to transfer of individuals. Large institutions have more chances to have diversified curriculum, academic and career counciling that promote transfer, and articulation agreement with four-year institutions. But this point has not been empirically tested.

The last contributing force in two-to-four year transfer is credits constrain of student, namely the tuition difference between four- and two-year institutions. Although well documented as important determinant in college choice studies (Manski 1983), costs related to transfer process has not been thoroughly studied. Transfer is not a smooth process without fiscal consequence. Except for the foregone earning of community college students if they already worked part-time, the direct costs related to transfer is substantial. The direct cost includes searching for and communicating with a four-year institution, fulfilling all the requirement of transfer of credits, paying tuition at four-year institution rate and perhaps reallocate time between study and work.

To simplify, we assume direct costs as tuition difference between four-and two-year institutions. We find transfer rate deteriorated in 1980s and remained in low level in 1990s while tuition and fees difference between four- and two-year colleges escalated. National Profile of Community College: Trends and Statistics (Philippe ed al. 1998) indicates that tuition in public community college increased moderately during the last two decades while price of four-year institutions escalated. From figure 1 we find that from early 1980s the tuition gap between two- and four-year institution widened consistently and didn't converge when the economy boomed in 1990s. There is also evidence that tuition gap is more significant between private two- and four-year institutions. Figure 2 shows that private four-year institution is even less affordable than public counterparts.

Evidences from study on economic benefit of community college by Rouse (1995, 1998) show that probability of attending a four-year college is negatively related to four-year college's tuition and positively related to two-year's price. If we look transfer as part of college choice process, we can hypothesize that transfer success is negatively correlated with tuition difference between public-four year college and student's own institution.

To summarize, there are six sets of variables that impact two-to-four year transfer. We will test their correlation with student transfer in the following statistic analysis. Although we know there is short-term or long-term benefit related to transfer and they can stimulate students to transfer, but we can not include them in this simple model[6].

Data, Definition, Models and Results

Data and Sample. The data set is based on 1989-94 Beginning Postsecondary Students Survey (BPS89/94) and The Integrated Postsecondary Education Data System (IPEDS) Enrollment Survey 89/90 and IPEDS Institutional Character Survey 89/90[7]. BPS included monthly enrollment record of each student for five years after 1989, and thus provided a reliable source of transfer (see Appendix A2 for discussion of variable data sources). The other advantage to use BPS is that it contains all first-time beginners and thus includes both students who just graduated from high school and those who enrolled after considerable delay.

BPS 89/94 contains originally around 8,000 observations and we merge it with IPEDS Enrollment and Institutional Survey to match students with their first enrolled institutions. We eliminate the observations without sufficient information on enrollment and correct institutional identifier in IPEDS89/90, and the sample size reduces to 5994 cases. Because we are interested

[6] Cost and benefit analysis can be applied more properly to the decision of whether or not to transfer, rather than analysis of determinants of success transfer as in our case. In fact, college transfer is a sequence of choices and actions and each one nests on the previous ones. See Becker, J.L. (1988) for an analysis of the search stage of the college choice process undertaken by community college transfer students.

[7] BPS95/01 was not available when the analysis was conducted although some descriptive analysis is released by NCES (Berkner, He, Cataldi and Knepper 2002). So we based our discussion on BPS89/94. The analysis based on BPS 95/01 will be done as extension of current paper.

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only in transfer from two- to four-year institution, we further restricted our sample to two-year entrants and exclude all the students who began college either at a 4-year institution or less-than-2-year institution. The procedure left us with 1370 observations.

Definition of Transfer and Educational Aspiration. In this paper we define "transfer" based only on pattern of student enrollment: any transition from one two-year institution to another four-year college that was not followed by a return to the first institution was defined as a transfer (McCormick & Carroll 1997). Students are not need to finish an associate's degree to be deemed a transfer student. We do not consider all multiple-institution enrollment as "transfer" by our definition, for instance we don't consider transfer from a 2-year institution to another 2-year (horizontal transfer) or less-than-2-year institution (reverse transfer) or from four-year college to less-than-four-year college (reverse transfer). Multi-institution transfer is recorded here as one transfer (i.e. transferred from 2-year to 4-year and to another 4-year is looked as one transfer).

The dependent variable is a dummy variable—Ever transferred in five years—to indicate whether a two-year entrant transferred to a four-year institution within five year after her initial enrollment in a two-year institution, no matter the destination is a public or private institution. The variable is constructed from student's five-year enrollment record based on BPS89/94. If in any year the enrolled institution changed from a two year to a public or private four-year institution, we counted the variable as "1" to indicate a transfer and "0" otherwise.

BPS89/94 revealed a clear transfer pattern for two-year entrants with different educational aspiration (McCormick & Carroll 1997, Bradburn, Hurst and Peng 2001). Among students with degree goal higher or equal to Bachelor degree (B.A. aspirant thereafter), 38.7 percent transfer to a four-year institution comparing to 22.4 percent of all two-year entrants (see table A1 for details). Such results are also found in study of transfer rate which shows transfer rate increases dramatically if sample is restricted to only B.A. aspirant (Grubb 1991, Wellman 2002).

Therefor in our statistic analysis, we estimate the probability of transfer of two groups of students: (1) B.A. aspirants; (2) all two-year entrants in BPS89/94. In the first model, we restricted our sample to students with higher aspiration and test the influence of student's internal and external factors on transfer conditioning on Bachelor degree aspiration. In the second model we assume student's personal factors and institutional traits have effects of on the transfer of all two-year beginners, with or without bachelor degree goals.

There are several aspiration measures in BPS89/94 which measure student educational aspiration at different point of time and by student's self-reported degree goals or activities toward their degree goals. We use student's stated "expected highest degree 1989/90 (EXEDCOL)" in BPS89/94 and construct a dummy variable for educational aspiration, "1" for degree goal being bachelor degree or higher and "0" otherwise. Alternative definition of aspiration is also used to test the existence of measurement error in educational aspiration and regression results are not changed much (see results in Appendix A3)[8].

Except for educational aspiration, other control variables include student's demographics and family background, college experience and sets of institutional characteristics. Demographic variables include three dummies for students age from 19 to 20, 21 to 30 and older than 30. There is one dummy for gender and three dummies for race. U.S. citizenship is reported also as one dummy. Parental education levels are divided into four groups. So the comparison group is male white U.S. born students who graduate from high school and were younger than 19 years old when first enrolled in a two-year institutions. The SES is also reported as logarithm of household income in 1988. As for college experience, one dummy indicates whether or not student has high school diploma other than Regent Diploma and one dummy shows that whether or not student

[8] EXEDCOL is used as measure of educational aspiration and the question in survey is "What is the highest level of education you ever expected to complete?" Alternative definition of education aspiration tested is "GOAL8990". The question in survey is "Toward which degree or other award are the courses you are taking leading?"

takes remedial math courses during prime semester. Credit hours enrolled in the first semester recorded in number of hours.

The last set of control variables is institutional characteristics. We include percentage of minority students, percentage of female students and percentage of part-time students, and total number of Full-time-equivalent students. Two dummies are used to represent private non-for-profit institution and private for-profit institution and one dummy indicates whether the college locates in large or middle cities and their fringe areas. And finally there exists one variable for in-state public four-year tuition and another variable for the tuition difference between in-state public four-year institution (if transferred destination is public four-year) and student own two-year college; or between in-state private four-year institution (if transferred destination is private four-year) and own two-year college.

Descriptive Analysis. Three groups of students are compared in our descriptive analysis: all two-year entrants, B.A. aspirants and students who successfully transferred during five years (transferred students thereafter, see Table 1 for details). The most significant difference across groups is in student's age. About 89 percent of transferred students are under or equal to 20 years old while only 68.5 percent of all two-year entrants are of same age. As for parental education, 31.8 percent of B.A. aspirants have parents with Bachelor degree or higher while 26.4 percent for all two-year entrants. More transferred students come from affluent family comparing to all two-year entrants.

According to college experience, transferred students are less likely to delay enrollment for college (18.6 percent of transferred students enter college late comparing to 45 percent of all two-year beginners). And transferred students accumulated more credit in their prime semester in college than B.A. aspirants and all two-year entrants.

From observable institution factors, 92 percent of transferred students attended public institutions while 88.3 percent of all two-year students began in public ones. One significant difference lies in

tuition and fees faced by different groups. 26.5 percent of transferred students pay tuition and fees higher than 50 percentile of their group, and the average tuition and fees they paid in 1989/90 semester are 5% more than that of all two-year entrants. The tuition difference between in-state-four-year colleges and their own colleges is $580, while for all two-year beginners is $770 on average.

Empirical Model and Results. The objective of this paper is to estimate the effects of individual and institutional factors on transfer. We employ logistic regression to estimate the probability of transfer with all control variables[9]. In brief we assume the probability of transfer to four-year institution is a function of students characteristics (demographics and family background and college experience), type of institutions they enrolled (demographic composition of student body, size of institution and its type and location), and tuition gap facing students when they intended to transfer.

The results are reported in Table 2. In the first six columns, we restricted our observations to B.A. aspirants and there are 854 cases left in data set. In the unconditional model (column 7 and 8), we include all two-year college entrants (1370 observations) and use student's educational aspiration as control variable. A separate regression for public two-year entrants (column 9 and 10) is estimated to see the difference in public and private institution's impact on transfer.

In conditional model with only B.A. aspirants, our findings confirmed results of Dougherty and Kinzel (2003) and McCormick and Carroll (1997) that older students are less likely to transfer and the negative impact is statistically significant and increasing in magnitude with age. The reason is that age is an index of a set of variables such as delayed enrollment, married and/or with dependent children, and they are all potentially negatively correlated with transfer success and highly correlated with each other. So we have to drop them from empirical model to avoid

[9] Linear Probability Model was used and obtained in similar results. Because of the good feature of CDF of logit model, we report only logit regression results. Multinormial regression can be introduced if we consider not only two-to-four year transfer but all possible transfers and drop-out in our model.

multicollinearity. Therefore non-traditional-age students stand in a disadvantaged position in transfer although they have similar degree goals as younger students.

Being Hispanics (Blacks) has slightly positive (negative) effect on transfer, but the effect is not significant. And female students are less likely to transfer holding other variables constant. It seems that the racial gap in transfer rate for different ethnic groups has converged, but gender gap is still persisting in our current sample cohort.

Higher parental education level (greater or equal to bachelor) and family income have positive impact on transfer, but only the effect of family income is statistically significant at 5 percent level. Students who accumulated more credit in prime semester have higher possibility to transfer and this confirms Lee and Frank (1990) finding from early 1990s.

In the unrestricted model, we test the effect of educational aspiration by using a dummy variable for it. High degree goal has a significant and positive impact on two-to-four year transfer and magnitude of coefficient is much larger than any other factor. The result is in line with previous literature which indicated that educational aspiration is the single most important determinant of transfer (Dougherty 1994, McCormick & Carroll 1997).

We run regression only on two-year entrants from public institution and try to find that after controlling for the type of institution, what other factors influence transfer. It shows that age, gender, accumulated credits and student aspiration are still significant.

Which institutional factors matter in promoting transfer? Our outcomes proved that only type of institution matters. Private institution enrollment, in either for-profit or non-for-profit institution, has systematic negative impact on student's subsequent transfer. Private for-profit institution transferred least students comparing to those public institutions, which take in students with similar educational aspiration. High concentration of minority student/ female students/ part-time students has negative but not significant effect on transfer and so does size of institution.

However those results may be biased by the potential measurement error[10]. Location of institution has positive but not significant effect, which fails to confirm the "metropolitan or urban premium in transfer" found in previous studies (Fratoe 1980). The impact of size of institution on student transfer is undetermined since the sign of coefficient changes when sample restriction changes.

The tuition difference—credit constraint in transfer—has negative and significant impact on two-to-four year transfer. The results confirm our observation in macro-level data and show that holding other variables constant, the probability of transfer decrease when tuition difference between in-state-four-year institution and own college increases. The finding has substantial policy implication since current state policy in promoting transfer rarely address the cost aspect of transfer. State articulation agreement and rigid control on community college tuition make transfer a more administratively easy but economically less affordable choice for many students.

Limitations and Policy Implication

Limitation. Our analysis was based on BPS89/94 and our conclusions are applicable only to this cohort of students. Besides we must be very cautious in generalizing our results to later cohort of students because the demographic characteristics and institution characters change substantially during 1990s (Berkner, He, Cataldi and Knepper 2002).

There are some unresolved problems in our estimation. First we used tuition difference as indicator of costs related to transfer process and left out other cost factors. However if there exists significant opportunity costs or differences in rate of return to different levels of education (e.g. B.A. vs. some college), we may overestimate the importance of tuition difference because of omitted variables. Intuitively, if the opportunity costs is higher or wage difference between B.A.

[10] One explanation is that those characteristics are not measured properly. Since IPEDS 89/90 didn't have data on percentage of minority and female students within institutions, we used instead the numbers from IPEDS 97/98 (the earliest years reporting such data) and we assume those variables are time-invariated. However, if the racial and/or gender composition of two-year institutions changes significantly overtime, our estimates will be biased toward zero because of measurement error.

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degree and Assoicate Degree is lower, the incidence of transfer will be lower even if the tuition difference holds constant.

Another problem is that most institutional factors we used are time-invariant or beyond the control of institution. For instance, the type of institution (public vs. private) and the degree of urbanity don't change overtime for most institutions. Public college tuition is more often a matter of political negotiation under business cycle rather than an autonomous decision of institution. Because we left out most time-variate measures because the lack of precise measure in BPS and IPEDS data sets, such as per FTE instructional cost, availability of academic/transfer consultant, faculty involvement in transfer promoting activity. If transfer is higher correlated with such factors, our results will be biased.

The last problem is the omitted state policy. Since many states have pro-transfer policies or legislation (EMC 2001), it may make difference if we fail to control for such policy. However, the initial attempt of including dummies for states which have pro-transfer policies was abandoned because most pro-transfer policies came in mid or late 1990s. For instance, by 1991 only twelve states had state articulation agreement and by 2001 the number increase to forty. Because of the time-lag between state policy imposition and changes in transfer behavior of students, we believe it is more accurate to use later longitudinal data set as BPS95/01 to study the influence of state policy.

Policy Implication. The paper tries to identify the major determinants of two-to-four year transfer for a cohort of two-year entrants who began their postsecondary study in 1989/90. It finds that the low level of two-to-four-year transfer is largely the result of the increasing tuition difference in two- and four-year institutions.

It also confirms that demographic and SES factors are still important in interpreting the difference in transfer, older or female students from low-income families are most disadvantaged group in

transfer process. Students having higher educational aspiration and accumulated more credits subsequently have much higher possibility of successful transfer.

The significant difference in public and private institution's performance in promoting student transfer gives us more insight on the new division of responsibility in community colleges. Recent studies show that the relationship between for-profits and community colleges is more accurate characterized as a division of labor with a few areas of overlap than as one of competition (Bailey, Badway and Gumport 2002). If that is the case, difference in transfer rate between private and public institution reflects the difference in their major missions and market strategy. And two-to-four-year transfer may not be a good performance indicator for private for-profit institutions.

How can our analysis on the impact of tuition difference on transfer influence state and institution policy? Currently state policies focus on promoting transfer of credits while pays less attention to recovering the costs of transfer. Education Commission of the States (2001) conducted comprehensive survey on state policies in transfer. Their results show that among 12 states which have incentives and/or awards for students to transfer, 9 states have various kinds of "credit transfer convenience"[11]; while only Illinois, Maryland and Wyoming have certain aid or scholarship directly for transferred students.

Although we have no knowledge of the effect of credit transfer convenience on successful transfer, but scholarship or tuition aid will certainly reduce the economic burden of transferred students and increase the pool of perspective transfer students by lowering their expected costs of transfer. Targeted financial aid package for perspective transfer students or transferred students can facilitate potential transfer and reduce "transfer shock" after transferring to a four-year institution. However the aid plan must be carefully designed in case of some four-year institutions increase their tuition to capture the benefit of state or federal transfer aid.

For future study we consider testing the effects of greater convenience in transfer of credits on two-to-four-year transfer, and also evaluate the influence of tuition gap on transfer with BPS95/01. Possible next step could be cost-effectiveness analysis on current policies alternatives: facilitating credit transfer and reducing tuition difference and transfer costs and we hope our results can shed some light on policy-making at system and institutional level concerning two-to-four year transfer.

[11] They include Alabama, Alaska, Georgia, Kentucky, North Carolina, South Carolina, North Dakota, Oklahoma and Virginia.

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Figure 1. Average Tuition and Fees by Sector of Institution (In constant 1997/98 Dollars)

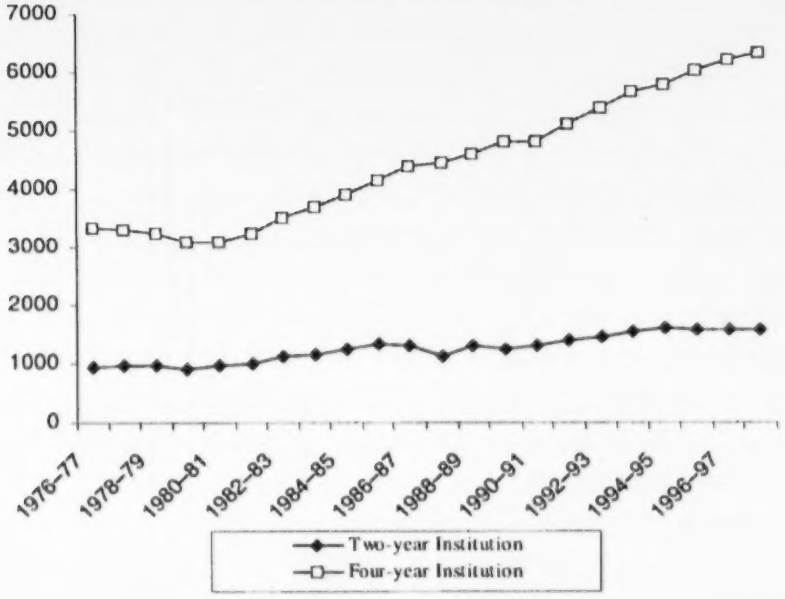

Figure 2.Tuition Difference in Public and Private Institutions (1976-1998)

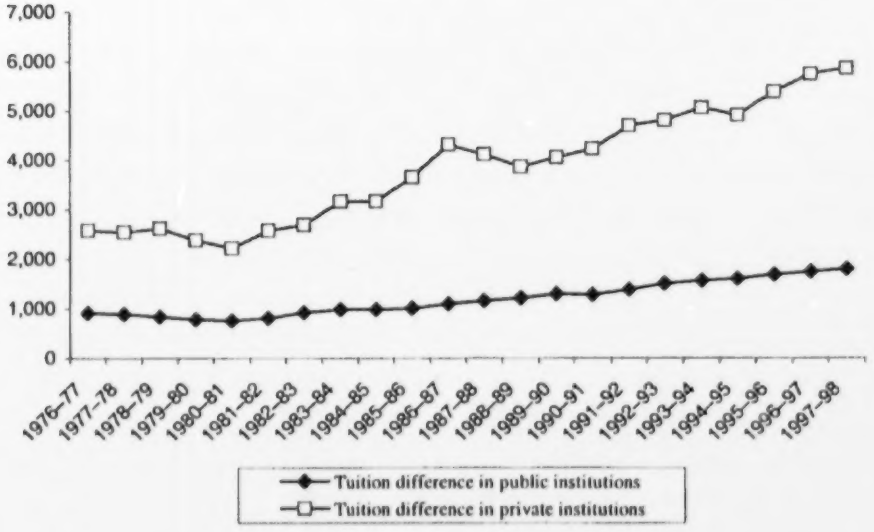

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Table 1: Characteristics of Sample

Variables	Began at 2-year	Began at 2-year & B.A. Aspirant	Transferred within 5 years
Number of observation	1,370	854	236
Frequency			
Transfer within Five Years (89/94)			
Yes	18.9	27.5	n.a.
No	81.1	72.5	n.a.
Age (quintiles)			
Smaller or equal to 20	68.50%	76.40%	89.10%
Larger than 20	31.50%	23.60%	10.90%
Gender			
Male	47.20%	48.40%	47.00%
Female	52.80%	51.60%	53.00%
Race			
White, non-Hispanic	74.30%	72.80%	76.90%
Black, non-Hispanic	9.30%	10.60%	6.20%
Hispanic	12.40%	11.70%	11.40%
Asian/Pacific islander	3.90%	3.90%	4.70%
American Indian/Alaskan native	n.a.	n.a.	n.a.
U.S. Citizen			
Yes	96.70%	97.40%	98.00%
No	3.30%	2.60%	2.00%
Parental Education (maximum)			
Less than high school	13.10%	8.90%	2.60%
High school graduate	38.50%	32.70%	32.90%
Trade school	3.10%	3.20%	3.30%
Less than 2 year college	7.60%	6.80%	7.90%
2 or more year college	11.30%	11.20%	12.30%
Bachelor's degree	17.00%	19.90%	22.20%
Postgraduate /professional	9.40%	11.90%	18.00%
Ln family income 1988 (Quintile)			
Bottom 25%	24.20%	21.20%	14.00%
Lower middle 25%	21.20%	21.90%	18.40%
Upper middle 25%	28.00%	27.20%	31.60%
Top 25%	26.50%	29.20%	35.90%
Type of H.S. diploma-B94			
Reg. diploma from public/priv. high sch.	91.40%	92.40%	97.90%
Diploma/certif: GED/oth equivalency test	8.00%	6.90%	1.300%
Certificate of high school completion	0.40%	0.50%	0.80%
Did not complete high school or equival.	0.20%	0.20%	n.a.
Whether take remedial math			
Yes	89.20%	87.90%	88.60%
No	10.80%	12.10%	11.40%
Delayed enrollment for college			
No	55.00%	63.30%	81.40%
Yes	45.00%	36.70%	18.60%
Distance inst. from home AY89-90-N90			
5 miles or less	27.00%	24.10%	24.80%
6-10 miles	22.40%	23.90%	25.70%
11-50 miles	42.50%	43.10%	38.30%
51-100 miles	3.40%	3.40%	1.40%

101-500 miles	3.30%	4.10%	7.70%
Over 500 miles	1.00%	1.20%	2.10%
Credit hours (quintile)			
Bottom 25%	47.80%	43.10%	22.30%
Lower middle 25%	26.00%	27.00%	31.50%
Upper middle 25%	16.80%	18.70%	26.60%
Top 25%	9.40%	11.20%	19.60%
Aid receipt AY89-90			
No aid	63.10%	68.90%	62.50%
Received aid	36.90%	31.10%	37.560%
Tuition and Cost AY89-90			
Bottom 25%	47.90%	48.40%	31.90%
Lower middle 25%	31.50%	34.80%	42.70%
Upper middle 25%	13.40%	14.60%	20.10%
Top 25%	7.30%	5.20%	5.30%
Institution control AY89-90			
Public	88.30%	89.30%	92.00%
Private not-for-profit	3.80%	4.30%	5.00%
Private for-profit	7.90%	5.80%	3.00%
Degree of urbanization			
large city	16.10%	15.50%	10.00%
mid-size city	29.60%	29.20%	28.20%
urban fringe of large city	27.70%	29.80%	26.90%
urban fringe of mid-size city	7.90%	7.90%	10.20%
large town	0.70%	0.60%	1.10%
small town	12.50%	12.90%	18.20%
rural	5.10%	3.40%	4.00%
not assigned	5.00%	0.70%	1.40%
Means			
Age as of 12/31/89	22.30	20.91	18.93
Number of credit hrs (sampled term)-N90	8.41	9.27	11.469
Tuition and fees AY89-90-N90	1006.98	961.56	1047
Percent minority students in institution	0.25	0.25	0.23
Percent female students	0.58	0.58	0.57
Percent part-time FTE	0.36	0.36	0.34
Total FTE (x1000)	4.36	4.65	4.44
In-state 4-year tuition(x1000)	1.76	1.72	1.62
In-state 2-year tuition(x1000)	0.82	0.79	0.73
Difference in 2/4 tuition (x1000)	0.77	0.78	0.58

Note: (Weighted cases by bps94awt) Data are merged from BPS90/94, IPEDS 8990 Fall Enrollment Survey, IPEDS 8990 Institutional Characteristics Survey, IPEDS 9798 Institutional Survey. In-state Public Institution tuition data are collected from Digest of Education. See Appendix for detailed discussion of data set.

Table 2. Logistic regression on B.A. aspirants, all 2-year entrants and public 2-year sample

	MODEL I B.A. Aspirants		MODEL II B.A. Aspirants		MODEL III B.A. Aspirants		MODEL IV All 2-year entrants		MODEL V Public 2-yearentrants	
	B	Exp(B)	B	Exp(B)	B	Exp(B)	B	Exp(B)	B	Exp(B)
Constant	-3.26	0.04	-3.51	0.03	-1.81	0.16	-4.20	0.02	-1.74	0.18
Age 19-20	-0.93**	0.39	-0.85**	0.43	-0.85**	0.43	-0.85**	0.43	0.76*	0.47
Age 21-30	-1.29**	0.28	-1.01**	0.36	-0.69	0.50	-0.66	0.52	-0.86*	0.42
Age >=31	-1.50*	0.22	-1.14*	0.32	-1.01	0.36	-1.14*	0.32	-2.06*	0.13
Race_ Black	-0.58	0.56	-0.56	0.57	-0.37	0.69	-0.22	0.80	-0.76	0.47
Race_ Hispanic	-0.09	0.91	-0.02	0.98	0.10	1.10	0.01	1.01	-0.47	0.63
Race_ American Natives	-0.31	0.74	-0.21	0.81	-0.05	0.95	-0.15	0.86	-0.54	0.58
Gender	-0.32	0.72	-0.36*	0.70	-0.45*	0.63	-0.42*	0.66	-0.51*	0.60
U.S. Citizenship	0.30	1.34	0.26	1.30	-0.36	0.70	-0.35	0.70	-0.30	0.74
Parental education less than high school	-0.65	0.52	-0.53	0.59	-0.65	0.52	-0.63	0.53	-0.83	0.43
PE trade school or less than 2 year college	0.21	1.23	0.25	1.28	0.31	1.37	0.31	1.36	0.47	1.61
PE 2 or more years of college	0.40	1.50	0.53	1.70	0.30	1.34	0.29	1.33	0.16	1.17
PE equal to B.A	0.44*	1.55	0.51*	1.66	0.25	1.29	0.42	1.52	0.26	1.29
PE equal to postgraduate	0.39	1.47	0.43	1.53	0.26	1.30	0.41	1.50	0.42	1.52
Log family income 1988	0.25**	1.29	0.21*	1.24	0.27**	1.30	0.27*	1.31	0.01	1.01
High school diploma other than Regent Diploma			-1.19*	0.30	-1.05	0.35	-1.06	0.35	-0.81	0.45
Taking Remedial Math			0.37	1.44	0.15	1.16	0.16	1.17	0.08	1.08
Credit hours enrolled in prime semester			0.05**	1.05	0.05**	1.05	0.05**	1.05	0.10*	1.11
Expected Highest degree equal or higher than B.A.							2.49**	12.09	2.44*	11.44
Percentage minority student					-0.83	0.44	-0.85	0.43	0.45	1.56
Percentage female student					-0.37	0.69	-0.28	0.76	-0.99	0.37
Percentage part-time student					-0.86	0.42	-0.92	0.40	-1.55	0.21
Full-time-equivalent, numbers of					-0.01	0.99	-0.02	0.98	0.03	1.03
Private non-for-profit					-1.29**	0.28	-1.19**	0.30		
Private for-profit					-1.85**	0.16	-1.63**	0.20		
Large or middle cities and their fringe areas					0.40	1.49	0.22	1.25	0.43	1.54
In-state public four-year tuition					-0.24	0.79	-0.34	0.71	-0.41	0.66
Difference in 4-year and own tuition					-0.27*	0.76	-0.23**	0.79	-0.18	0.83
-2 Log likelihood	871.1		840.4		675.8		740.8		419.9	
Cox & Snell R Square	0.117		0.134		0.192		0.240		0.254	
Nagelkerke R Square	0.168		0.192		.273		0.376		0.391	
Number of observation	854		854		854		1370		702	
Overall Percentage of correct prediction	71.1		72.0		75.7		82.2		81.7	

Note: *Estimate significant at p<0.05; **Estimate significant at p<0.

Appendix

In this brief paper, we use information from multiple postsecondary longitudinal survey. The major information sources are Beginning Postsecondary Student Longitudinal Study (BPS 89/94) and The Integrated Postsecondary Education Data System (IPEDS)—Fall Enrollment Survey 1989/90 and Institutional Characteristics Survey 1989/90 and 1997/98. The reason for use more than one institutional survey is that many information are not collected in early years and they are time-invariant by nature, such as control and location of institutions. Table A2 presents the variable construction and their initial sources.

The BPS survey and IPEDS survey are merged with UNITID, and there are two reasons for the loss of some observations. First, some of students in BPS don't have complete enrollment information in IPEDS Fall Enrollment Survey or their institution identifiers are invalid (900xxx). Second some of IPEDS institutions exist in 1989/90 disappeared in later years, so we can not attribute correct institution information to students and have to take those observations away. Such clear-up process lefts us around 5400 observations with complete individual and institutional data. Among which 1,370 students are two-year beginners.

Table A1. Of 1989/90 beginning students at public 2-year institutions, percentage distribution according to transfer, by stated degree goal: 1989-94

	Did not Transfer	Transferred to 4-year	Transferred to 2-year	Transferred to less-than-2-year
Total	57.8	22.4	14.2	5.6
Degree goal: 1989/90				
None	65.6	8.7	17.3	8.4
Certificate	87.3	2.4	4.5	5.9
Associate Degree	56.1	22.9	15.5	5.6
Bachelor's Degree	40.3	38.7	16.2	4.8

Note: Degree goal constructed from EXEDCOL ("What is the highest level of education you ever expected to complete?").
Source: McCormick & Carroll 1997, Table 18. Original from 1989-90 Beginning Postsecondary Students Longitudinal Study. Second Follow-up (BPS90/94). Data analysis System.

Table A2: Variable and Sources

Variable list	Definition	Data sources
Ever transferred from 1989-1994	Transfer from any two-year to any four-year institution within 5 successive years.	Constructed from ctrl8990-ctrl9394 and schl8990 schl9394. BPS90/94
AGE	Age as of 12/31/89	BPS90/94
BPSRACE	Derived race/ethnicity from BPS	BPS90/94
H_GENDR	Gender-B94	BPS90/94
H_CITIZ	Whether U.S. citizen-B94	BPS90/94
RPARED	Parent's education recorded (maximum)	BPS90/94
LN_INCOM	Ln of family income 1988	BPS90/94
H_HSDIP	Type of H.S. diploma-B94	BPS90/94
REMMATH	Remedial math-N90	BPS90/94
DELAYENR	Delayed enrollment	BPS90/94
CREDHRS	Number of credit hours (sampled term)-N90	BPS90/94
DISTANCE	Distance inst. from home AY89-90-N90	BPS90/94
TUI_8990	Tuition and fees AY89-90-N90	BPS90/94
AID8990	Aid receipt AY89-90	BPS90/94
PCT_MINO	Percentage of minority students	Constructed from 5 ethnicity groups, IPEDS-EF97/98
PCT_FEM	Percentage of female students	Constructed from total # of male and female students, IPEDS-EF97/98
PCT_PT	Percentage of part-time students	Constructed from total # of part-time students, IPEDS-EF89/90
FTE_AD	Total number of FTE	Constructed from total # of full/part-time students, IPEDS-EF89/90
CTRL8990	Institution control AY89-90	BPS90/94
LOCALE	Degree of urbanization	IPEDS-EF97/98
CARNEGIE	Carnegie Classification Code	IPEDS-EF97/98
TUI_4YR	In-state 4-year tuition	T.A.
TUI_DIFF	In-state 2-year tuition	T.A.

Table A3. With alternative definitions of educational aspiration

	MODEL II B.A. aspiration EXEDCOL		MODEL III B.A. aspiration GOAL8990		MODEL IV All 2yr entrants EXEDCOL		MODEL V All 2yr entrants GOAL8990	
	B	Exp(B)	B	Exp(B)	B	Exp(B)	B	Exp(B)
Constant	-1.81	0.16	2.35	10.48	-4.20	0.02	-3.23	0.04
Age 19-20	-0.85**	0.43	-0.43	0.65	-0.85**	0.43	-0.81**	0.44
Age 21-30	-0.69	0.50	-1.16	0.31	-0.66	0.52	-0.58	0.56
Age >=31	-1.01	0.36	0.08	1.09	-1.14*	0.32	-1.03*	0.36
Race_ Black	-0.37	0.69	0.11	1.12	-0.22	0.80	0.09	1.09
Race_ Hispanic	0.10	1.10	-1.02	0.36	0.01	1.01	-0.08	0.92
Race_ American Natives	-0.05	0.95	-0.25	0.78	-0.15	0.86	-0.01	0.99
Gender	-0.45*	0.63	-1.30**	0.27	-0.42*	0.66	-0.36	0.69
U.S. Citizenship	-0.36	0.70	0.60	1.82	-0.35	0.70	0.32	1.38
Parental education (P.E.) less than high school	-0.65	0.52	-0.03	0.97	-0.63	0.53	-0.38	0.68
P.E. trade school or less than 2 year college	0.31	1.37	-0.08	0.93	0.31	1.36	0.36	1.44
P.E. 2 or more years of college	0.30	1.34	0.00	1.00	0.29	1.33	0.47	1.60
P.E. equal to B.A	0.25	1.29	0.26	1.30	0.42	1.52	0.73**	2.07
P.E. equal to postgraduate	0.26	1.30	0.80	2.23	0.41	1.50	0.95**	2.59
Log family income 1988	0.27**	1.30	-0.07	0.93	0.27*	1.31	0.22	1.24
High school diploma other than Regent Diploma	-1.05	0.35	-0.18	0.84	-1.06	0.35	-0.84	0.43
Taking Remedial Math	0.15	1.16	0.30	1.35	0.16	1.17	-0.05	0.95
Credit hours enrolled in prime semester	0.05	1.05	0.04	1.04	0.05**	1.05	0.05*	1.05
Educational Aspiration Measure					2.49**	12.09	0.82**	2.28
Percentage minority student	-0.83	0.44	-1.03	0.36	-0.85	0.43	-0.56	0.57
Percentage female student	-0.37	0.69	-0.71	0.49	-0.28	0.76	-0.01	0.99
Percentage part-time student	-0.86	0.42	-1.63	0.20	-0.92	0.40	-0.48	0.62
Full-time-equivalent, numbers of	-0.01	0.99	0.15	1.16	-0.02	0.98	-0.02	0.98
Private non-for-profit	-1.29**	0.28	-5.58**	0.00	-1.19**	0.30	-0.86**	0.42
Private for-profit	-1.85**	0.16	-5.39**	0.00	-1.63**	0.20	-1.72**	0.18
Large or middle cities and their fringe areas	0.40	1.49	1.64**	5.14	0.22	1.25	0.26	1.30
In-state public four-year tuition	-0.24	0.79	-0.43	0.65	-0.34	0.71	-0.32	0.73
Difference in 4-year and own tuition	-0.27*	0.76	-1.20*	0.30	-0.23**	0.79	-0.23*	0.79

-2 Log likelihood	675.8	740.8	709.4
Cox & Snell R Square	0.192	0.240	0.180
Nagelkerke R Square	.273	0.376	0.282
Number of observation	854	1370	1370
Overall Percentage of correct prediction	75.7	82.2	81.0

Note: Author's calculation.

* significant at p value smaller than 0.05.

**Estimate significant at p value equals to 0.00.

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